

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of

Applicant: Chen, et al.  
Continued Prosecution  
Application of  
Serial No.: 08/997,774 filed December 24, 1997 with a first CPA  
filed November 21, 2000  
Title: CATALYTIC CONVERTER SYSTEM FOR INTERNAL COMBUSTION  
ENGINE POWERED VEHICLES  
Art Unit: 1764  
Examiner: H. Tran

COMMISSIONER FOR PATENTS  
UNITED STATES PATENT AND TRADEMARK OFFICE  
WASHINGTON, DC 20231

ATTENTION: BOARD OF PATENT APPEALS AND INTERFERENCES

APPELLANTS' BRIEF (37 C.F.R. 1.192)

This is an appeal from the final rejection dated December 29, 2000, a Notice of Appeal having been filed on March 29, 2001. A Petition for a three-month extension of time and the requisite fee is being submitted herewith.

The fees required under Section 1.17(a), and any petition for extension of time for filing this brief and fees therefor, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief is transmitted in triplicate. (37 CFR 1.192)

This brief contains the items set forth in the Table of Contents under the following headings as set forth below (37 CFR 1.192(c):

CERTIFICATE OF MAILING UNDER 37 C.F.R. 1.10

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I hereby certify that this correspondence (along with any paper referenced as being attached or enclosed) is being deposited on the date shown below with the United States Postal Service in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EM507977443US addressed to Commissioner for Patents, United States Patent and Trademark Office, Washington, DC 20231, Attention: Board of Patent Appeals and Interferences.

Date: September 28, 2001

Phyllis Nova

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**APPELLANTS' BRIEF (37 C.F.R. 1.192)**

This is an appeal from the final rejection dated December 29, 2000, a Notice of Appeal having been filed on March 29, 2001. A Petition for a four-month extension of time and the requisite fee is being submitted herewith.

1. REAL PARTY INTEREST

The real party interest of the subject patent application is Engelhard Corporation with headquarters at 101 Wood Avenue, Iselin, New Jersey 08830-0770.

2. RELATED APPEALS AND INTERFERENCES

There are no related pending appeals or interferences.

3. STATUS OF CLAIMS

The claims pending in this application are claims 1-7, 9-11, 15, and 17-20, and all of said claims are on appeal.

4. STATUS OF AMENDMENTS

The following amendment was made and entered in the parent application:

February 24, 2000, amendments were made to claims 1-20. The amendment was entered and claims 16 and 21 were finally restricted.

October 27, 2000, amendments after final rejection were made to claims 1, 3, 4, 8, and 12 and claims 16 and 21 were canceled without prejudice to filing a divisional. The amendment was not entered.

The following amendments were made and entered in the present CPA application:

October 27, 2000, amendments after final rejection were made to claims 1, 3, 4, 8, and 12 and claims 16 and 21 were canceled without prejudice to filing a divisional. The amendment was entered.

August 28, 2001, an amendment which accompanies this Appeal Brief canceling claims 12 and 13.

September 28, 2001, an amendment after final rejection which is submitted with this Appeal Brief. The claims have been presented including this amendment.

5. SUMMARY OF INVENTION

The present invention is defined by claims 1-7, 9-11, 15, and 17-20. Briefly, the present invention is directed to a low temperature catalytic converter system and related method. The system is designed to have a catalyst at a location which is at a relatively low temperature which is never in excess of 550°C (claim 1), more specifically 500°C (claim 14), and yet in more specific embodiments 300°C (claim 15). Specific embodiments have the catalyst located at the muffler position or the tailpipe position. (claims 3, 4) In order to be effective the catalyst has a light-off temperature of less than about 200°C and in more specifically 100°C, and yet in more specific embodiments 70 to 100°C. (claims 1, 20) As indicated in the specification at page 11, lines 6-7, the light-off temperature is the temperature at which the catalyst material attains fifty percent conversion performance. (Spec. p. 11, lines 6, 7)

The catalyst is used in combination with a hydrocarbon adsorbent material. The adsorbent material is capable of desorbing the adsorbed hydrocarbons when the temperature of the low temperature catalyst has

exceeded the light-off temperature. (claim 1) Preferably, the adsorbent material and the low temperature catalyst can be located on one refractory carrier. (claim 2)

Optionally, (claim 1) and in specific embodiments (claims 6 and 7) there can be an upstream conversion catalyst located to be exposed to temperatures in excess of 650°C.

In specific embodiments the low temperature conversion catalyst comprises platinum supported on titania support material. The low temperature conversion catalyst can be reduced to enhance its activity for converting hydrocarbons and carbon monoxide to innocuous compounds.

The adsorbent material can comprises a hydrothermally stable molecular sieve material having a T(50) of at least about 750°C, a hydrocarbon selectivity greater than 1, and a Si/Al ratio of at least about 10. Hydrothermal stability can be considered the temperature at which 50% of the structure is decomposed after heating for 16 hours. That temperature is referred to as T(50). (Specification page 22, lines 23-30) The low temperature conversion catalyst can be located relative to the exhaust gas stream such that said low temperature conversion catalyst is never exposed to a temperature in excess of about 500°C. (Claim 5)

The low temperature conversion catalyst and adsorbent material can be disposed in the same or separate layers on a refractory carrier and are located relative to the exhaust gas stream such that said low temperature conversion catalyst is never exposed to a temperature in excess of about 300°C. (Claim 9) The refractory carrier is in the form of a honeycomb configuration having cell comprising cell walls. (Claims 9-11)

The low temperature conversion catalyst can comprise from about 10 to about 1000 g/ft<sup>3</sup> of said platinum group metal in said.

#### Unexpected Results

Finally, reference is made to the unexpected results illustrated in the Examples. In particular, reference is made to the results

presented in the Examples (Pages 25-29). Particular reference is made to the results in the Table at page 27, lines 24-33.

6. STATEMENT OF ISSUES

Note: Claims 8, and 12-14 have been canceled. The issues are presented without these claims.

6.1 Whether claims 2, 9-11, 15 and 18-19 are unpatentable under 35 USC 112 second paragraph.

6.2 Whether claims 1-2, 6, 10-11, (17-19)/1 are unpatentable under 35 USC 102(b) as anticipated by several references as summarized in Table 1 below.

6.3 Whether claims 1-7, 9-11, 15 and 17-19 are unpatentable under 35 USC 103(a) as obvious over several references as summarized in Table 1 below.

All of the claims have been rejected as anticipated or obvious over various of the following references taken alone or together:

1. US 5,538,697 (Abe)
2. EP 747,581 (EP'581)
3. WO 96/39244 (WO'244)
4. WO 97/00119 (WO'119)
5. EP 602,963 (EP'963)
6. US 5,218,817 (Urata)
7. US 3,675,398 (Giarrizzo)
8. US 5,078,979 (Dunne).

**TABLE 1**

O.A. ¶	35 USC §	CLAIMS	REFERENCES
6.	102(b)	1-2, 6, (17-19) / 1	Abe
7.	102(b)	1-2, 10-11	EP'581
8.	102(b)	1-2, 10-11, (17-19) / 1	WO'244
9.	102(b)	1-2, 10-11, (17-19) / 1	WO'119
13.	103	1-2, 6, 10-11, (17-19) / 1	EP'963 v Abe
14.	103	3-4, 9, 15, (17-19) / 1	WO'119, EP'963 v Abe, or WO'244 v Urata + Giarriizzo
15.	103	5-7, (17-19) / 5	Abe or EP'963 v Abe further v Dunne
16.	103	5, (17-19) / 5	WO'119 or WO'244 v Dunne
17.	103	6	EP'581, WO'119 or WO'244 v EP'963
18.	103	7	EP'581, WO'119 or WO'244 v Dunne + EP'963
19.	103	3-4, 9, 15, (17-19) / (3-4)	Abe v Urata + Giarriizzo
20.	103	3-4, 9, 15	EP'581 v Urata + Giarriizzo
21.	103	5	EP'581 v Dunne
22.	103	(17-20) / 1	EP'581 v WO'119 or WO'244 or EP'963
23.	103	3-4, (17-20) / (3-4)	EP'581 v Urata + Giarriizzo v WO'119 or WO'244 or EP'963
24.	103	(17-20) / 5	EP'581 v Dunne v WO'119 or WO'244 or EP'963
25.	103	20 / (1)	Abe or WO'119 or WO'244 or EP'963 v Abe v EP'581
26.	103	20 / (3-4)	Abe or WO'119 or WO'244 or EP'963 v Abe v Urata + Giarriizzo v EP'581
27.	103	20 / (5)	Abe or WO'119 or WO'244 or EP'963 v Abe v Dunne v EP'581

7. GROUPING OF CLAIMS

All of claims will stand or fall together.

8. ARGUMENTS

Note: Claims 8, and 12-14 have been canceled. The arguments are presented without these claims.

8.1 35 USC 112

Claims 2, 9-11,15 and 18-19 have been indicated to be rejected under 35 USC Section 112, second paragraph.

The Examiner asserts that, "In claim 2, line 3, "it is unclear as to how the refractory carriers are related to the support material as set forth in claim 1, lines 7-8." A similar rejection is made with regard to claims 10, 18-19.

The support and the carrier are two separate elements of the claims. They are specifically and clearly recited in the claims and the specification.

Claim 1 provides for "a catalyst comprising platinum... ..dispersed on a support material...".

The support is a part of the composition of the catalyst. For example reference is made to the specification at page 19, lines 16-30 which describes support materials which are in particulate form and are part of the catalyst composition. Therefore, the support is part of the catalyst.

Claim 2 provides for the catalyst (the catalyst comprises a platinum group metal component dispersed on the support) to be deposited on a refractory carrier.

The carrier is a configured material on which the active composition such as the catalyst material is located. For example reference is made to the specification at page 24, beginning at line 8



which describes carriers. Therefore, the catalyst (which includes a support) is deposited on a carrier.

It is admonished that the terminology should be consistent throughout the claims (i.e., claims 1, 2, 10, 18 and 19). For the reasons given above the terminology is consistent between claims 1 and 2. In view of the claims, and consistent with the description in the specification of the support and carrier elements, claims 10, 18, and 19 are consistent among themselves, with claims 1 and 2, and with the specification. Each of claims 10, 18, and 19 are directed to honeycomb configured carriers on which the catalyst (which includes a platinum group metal dispersed on a support material). For the above reasons the support and carrier elements are clearly claimed and their relationship clearly presented.

Accordingly, withdrawal of the rejection of claims 1, 2, 10, 18 and 19 under 35 USC 112 is respectfully requested.

Claims 9 and 15 were rejected for reasons similar to claims 1, 2, 10, 18 and 19. See the above discussion with regard to claims 2, 18 and 19. Accordingly, withdrawal of the rejection of claims 8 and 14 under 35 USC 112 is respectfully requested.

8.2 Detailed Arguments - The Present Invention Is Not Anticipated over the Cited Art, Rejections under 35 USC § 102

O.A. ¶6. Claims 1-2, 6, (17-19)/1 have been rejected under 35 USC § 102(b) as being anticipated by US 5,538,697 (Abe).

Abe does not disclose or suggest the presently claimed catalytic converter system. A principal difference is that the present invention is directed to a system for location at cooler location of the exhaust stream. Abe, does not disclose the location of the catalyst to be based on a requirement that the catalyst not be exposed to a temperature in excess of 550°C. Rather Abe is directed to addressing hydrocarbon pollutants when the engine is running during

the cold start time period. This is indicated by the cold-start period during the FTP testing. Furthermore, there is no disclosure or suggestion that the catalyst have a light-off temperature of less than about 200°C as claimed in the present invention. (Claim 1) In essence, Abe does not disclose any criteria, such as temperature exposure, which characterizes the location of the catalyst. Abe is merely using cold start conditions, wherever the catalyst located.

The Examiner particularly cites Abe at col. 21, lines 1-8. However, this is only for a cold-start period of the FTP test. Furthermore, this is for Abe's "System C" which is described at col. 17, lines 26-40 requiring secondary air-feeding for ignition acceleration. As, indicated, the presently claim system is in a location of cold environment of the exhaust stream at which the catalyst having the recited light-off temperature and is not exposed to temperatures greater than 550°C.

Therefore, Abe is directed to a different system than presently claims and does not disclose or claim significant elements of the presently claimed invention. Accordingly, withdrawal of the opinion that any of the claims 1-2,6,(17-19)/1 as anticipated by Abe is respectfully requested.

O.A. ¶7. Claims 1-2, and 10-11 have been rejected under 35 USC § 102(b) as being anticipated by EP 747,581 (EP'581).

This reference is cited as disclosing a catalytic reactor system comprising a supported platinum catalyst and a hydrocarbon adsorbent deposited on a refractory carrier. Page 3, line 59 is cited as disclosing a gas inlet temperature of between 40 and 300°C. Page 2, lines 55-59; and page 3, lines 18-22 are cited as disclosing that the catalyst and adsorbent are disposed in separated layers or same layer deposited on the cell walls of a honey comb configuration.

A review of the reference shows it to be directed to predrying a catalyst/hydrocarbon trap system. There is no disclosure to locate a low temperature catalyst downstream of an engine never to be exposed

to a temperature in excess of 550°C. As indicated in EP'581 the catalyst/trap system is designed for start-up. The gas inlet temperature of between 40 and 300°C referred to by the Examiner was for a synthetic exhaust gas. Where the system was tested on an engine (Test 10, at page 10) no such temperature limitation is disclosed. The catalyst of EP'581 is not disclosed to be located downstream of an engine never to be exposed to a temperature in excess of 550°C.

Accordingly, withdrawal of the opinion that any of the claims 1-2, and 10-11 as anticipated by EP 747,581 is respectfully requested.

O.A. ¶8. Claims 1-2, 10-11, (17-19)/1 have been rejected under 35 USC § 102(b) as being anticipated by WO 96/39244 (WO'244).

This reference is cited as disclosing a catalytic reactor system comprising a supported platinum catalyst and a hydrocarbon adsorbent deposited on a refractory carrier at page 6, lines 10-22. The gas inlet temperature is cited as being between 150 and 200°C. With respect to claims 2, 10-11, (18-19)/17/1, WO 96/39244 is cited as disclosing at page 6, lines 19-22; and page 7, lines 8-12 that the catalyst and adsorbent are disposed in separated layers or same layer deposited on the cell walls of a honeycomb configuration.

A review of the reference shows it to be directed to a lean NOx catalyst and a hydrocarbon adsorbent. There is no disclosure to locate a low temperature catalyst downstream of an engine never to be exposed to a temperature in excess of 550°C. As indicated in WO'244 the catalyst/trap system is designed so that "during the lower exhaust temperature parts of the engine operating cycle, the adsorbent adsorbs unburned fuel, and during the higher exhaust gas temperature parts of the operating cycle...". This is contrary to the present inventions which is directed to a catalytic converter system located never to be exposed to a temperature in excess of about 550°C.

The gas inlet temperature of between 150 and 200°C (page 8, lines 5-8, Figure 2) referred to by the Examiner was disclosed, but during this range "there is very low conversion of NO and HC." (Page 8, line

7). This is contrary to the use of a low temperature conversion catalyst in the present invention which has a light-off temperature of less than about 200°C. The goal of the present invention is to be able to achieve significant conversion below 200°C.

Accordingly, withdrawal of the opinion that any of the claims 1-2, 10-11, (17-19)/1 as anticipated by WO 96/39244 is respectfully requested.

O.A. ¶ 9. Claims 1-2, 10-11, (17-19)/1 have been rejected under 35 USC § 102(b) as being anticipated by WO 97/00119 (WO'119).

This reference is cited at page 6, lines 10-22 as disclosing a catalytic reactor system comprising a supported platinum catalyst and a hydrocarbon adsorbent deposited on a refractory carrier. Page 30, line 5 is cited as disclosing a gas temperature of between 200 and 400°C. Page 19, lines 2-10 is cited as disclosing that the catalyst and adsorbent are disposed in separated layers or same layer deposited on the cell walls of a honeycomb configuration. With respect to claim 17/1, WO'119 is cited as disclosing the specific amount of platinum group metal of 1-200g/ft<sup>3</sup>.

A review of the reference shows it to be directed to a catalyst/hydrocarbon trap system which oxidizes gaseous hydrocarbons and carbon monoxide without the substantial conversion of SO<sub>2</sub> to SO<sub>3</sub>. There is no disclosure to locate a low temperature catalyst downstream of an engine never to be exposed to a temperature in excess of 550°C.

The gas inlet temperature of between 200 and 400°C (page 30, line 5) referred to by the Examiner was disclosed, but during this range Table 2 of WO'119 shows that there is very low conversion of HC at 200°C. (Page 30, lines 7-15) This is contrary to the use of a low temperature conversion catalyst in the present invention which has a light-off temperature of less than about 200°C.

8.3 Summary of Arguments - The Present Invention Is Not Obvious over the Cited Art, Rejections under 35 USC § 103

The claims have been rejected over primary references which disclose systems to treat exhaust gases which contain in combination the use of a catalyst and an adsorbent. The adsorbent is disclosed as being located with the catalyst or upstream of the catalyst. The systems are disclosed to be designed to be able to treat exhaust gases during the cold start period of engine operation. Typically, during start-up the gases and exhaust system are colder than during steady state operation. The temperatures are too cold for the catalyst to be effective. Therefore, an adsorbent is used to trap hydrocarbons until the system heats up. When the system heats up, the hydrocarbon gases are desorbed and oxidized on the heated catalysts. (Abe, EP'581, WO'244) WO'119 is separately distinguished above.

Secondary references such as Urata and Giarrizzo are cited as disclosing catalyst located in the muffler or tailpipe.

The general basis of the rejection is that it would be obvious to use the catalyst/adsorbents of the primary references in the location of the secondary references.

Initially, the present invention is directed (e.g. claim 1) to a system where the location of a specific low temperature conversion catalyst (having a light-off temperature of less than 200°C) is determined to be at a location relative to the exhaust gas stream such that said low temperature conversion catalyst is never exposed to a temperature in excess of about 550°C. A hydrocarbon adsorbent material is located upstream of the low temperature conversion catalyst.

In a specific embodiment (claims 6,7) an upstream conversion catalyst, said upstream conversion catalyst, when present, being located upstream of said low temperature conversion catalyst relative to the direction of flow of exhaust gas stream to be exposed to temperatures in excess of 650°C.

None of the references, either primary or secondary disclose a system where the location of the catalysts is determined by the downstream low temperature catalyst and upstream conversion catalyst.

Although combinations of catalysts and adsorbents are used they are used either during cold start effectiveness or in a diesel system to oxidize hydrocarbons without the substantial conversion of  $\text{SO}_2$  to  $\text{SO}_3$ .

There there is no basis for one skilled in the art to locate the catalysts of the primary references in the location of the secondary references. The secondary references do not disclose or suggest such low temperature catalyst or their combination with adsorbents.

Accordingly, the presently claimed system is not obvious over any combination of primary or secondary references.

8.4 Detailed Arguments - The Present Invention Is Not Obvious over the Cited Art, Rejections under 35 USC § 103

O.A. ¶ 13. Claims 1-2, 6, 10-11, (16-19)/1 have been rejected as obvious over EP 602,963 (EP'963) in view of Abe.

EP'963 has been cited as disclosing a catalytic reactor system comprising a supported platinum catalyst and a hydrocarbon adsorbent deposited on a refractory carrier. Page 6, line 28-29 is cited as disclosing that although the catalyst is preferably placed near the engine exhaust port, it may be placed at any other position in the exhaust pipe. The Examiner concludes that it would be obvious to one of ordinary skill in the art to select an appropriate location for the catalyst based on the teaching of EP'963 since it has been held that rearranging parts of an invention involves only routine skill in the art. Abe is cited as illustrating that the catalyst is a specific distance downstream from the engine so that the gas temperature at the inlet is to the monolith is between 72 and 300°C. Page 4, lines 18-39, and page 5, lines 2-3 are cited as disclosing that the catalyst and adsorbent are disposed in separated layers or same layer deposited on the cell walls of a honeycomb configuration.

A review of the EP'963 reference (Abstract at page 1, specification at page 2, lines 5-10) shows it to be directed to a cold start catalyst/hydrocarbon trap system. There is no disclosure to

locate a low temperature catalyst downstream of an engine never to be exposed to a temperature in excess of 550°C. Furthermore, EP'963 does not contemplate the low temperature system of the present invention. The goal of the present invention is to achieve significant conversion below 200°C.

Accordingly, withdrawal of the rejection that any of the claims 1-2, 6, 10-11, (16-19)/1 as obvious based on EP'963 in view of Abe is respectfully requested.

O.A. ¶ 14. Claims 3-4, 9, 15, (17-19)/(3-4) have been rejected as obvious over WO'119, EP'963 in view of Abe, or WO'244 in view of US 5,218,817 (Urata) and US 3,675,398 (Giarrizzo). For the reasons that follow reconsideration and withdrawal of the rejection is respectfully requested.

Initially, reference is made to the above discussion distinguishing the WO'119, EP'963, Abe, and WO'244. Generally, none of them disclose locating a catalyst having a light-off temperature of less than 200°C at a location relative to the exhaust gas stream such that said low temperature conversion catalyst is never exposed to a temperature in excess of about 550°C. Furthermore, the Examiner recognizes that these references do not disclose that the catalyst may be placed in the tail pipe or the muffler.

Urata is cited as showing that catalyst may be placed in the tail pipe or muffler. However, Urata is directed to the placement of a catalyst in the exhaust pipe of an engine for a small generator, industrial machines or the like having a short exhaust system. There is no disclosure of the temperatures or other conditions to which the catalyst is exposed. Furthermore, there is no disclosure that such a catalyst would never be exposed to a temperature in excess of about 550°C. Accordingly, there is no basis to combine Urata with any of WO'119, EP'963 in view of Abe or WO'244 to make obvious any of the embodiments presently claimed.

Giarrizzo is also cited as showing that catalyst may be placed in the tail pipe or muffler. However, Giarrizzo is directed to the

placement of a filter at the exhaust pipe of an engine for a motor vehicle. There is no disclosure or suggestion that Giarrizzo can be used with the claimed low temperature catalyst or adsorbent. Furthermore, there is no disclosure that such a catalyst is a low temperature conversion catalyst of the present invention which has a light-off temperature of less than about 200°C. Accordingly, there is no basis to combine Giarrizzo with any of WO'119, EP'963 or WO'244 to make obvious any of the embodiments presently claimed.

Accordingly, withdrawal of the rejection that any of claims 3-4, 9,15,(17-19)/(3-4) have been rejected as obvious over WO'119, EP'963, or WO'244 in view of Urata and Giarrizzo as obvious is respectfully requested.

O.A. ¶ 15.Claims 5-7 (16-19)/5 have been rejected as obvious over Abe or EP'963 in view of Abe as applied above and further in view of US 5,078,979 (Dunne). For the reasons that follow reconsideration and withdrawal of the rejection is respectfully requested.

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Initially, reference is made to the above discussion distinguishing the Abe, and EP'963 v Abe.

Dunne is cited as disclosing an adsorbent as presently claimed in certain embodiments. However, there is no motivation for one skilled in the art to combine Dunne with any of Abe, or EP'963 in view of Abe to make obvious any of the embodiments presently claimed. Initially, there is no disclosure in Dunne to locate the catalyst so as to never be exposed to a temperature in excess of about 550°C. As indicated at col.3, lines 9-12 Dunne is concerned with exposure to exhaust gases during cold-start. As indicated in Dunne at col. 4, lines 8-25 such conditions even up to "below 500°C" are encountered during this cold period. In certain of the cited references, it is desirable to use adsorbents which trap hydrocarbons to be desorbed at higher temperatures then disclosed in Dunne. Therefore, for the reason discussed above with regard to the primary references the disclosure



of the adsorbents in Dunne can not be combined with such references to obviously achieve the presently claimed invention.

Accordingly, withdrawal of the rejection that any of claims 5-7 (16-19)/5 have been rejected as obvious over Abe, or EP'963 in view of Abe further in view of Dunne as obvious is respectfully requested.

O.A. ¶ 16. Claims 5, (17-19)/5 have been rejected as obvious over WO'119 or WO'244 in view of Dunne. For the reasons that follow reconsideration and withdrawal of the rejection is respectfully requested.

Reference is made to the above discussion distinguishing the WO'119, and WO'244 in view of Dunne. The same comments apply.

Accordingly, reversal of the rejection of claims 5, (17-19)/5 have been rejected as obvious over WO'119 or WO'244 in view of Dunne as obvious is respectfully requested.

O.A. ¶ 17 Claim 6 has been rejected as obvious over EP'581, WO'119 or WO'244 in view of EP'963. For the reasons that follow reconsideration and withdrawal of the rejection is respectfully requested.

Initially, reference is made to the above discussion distinguishing the cited references. Additionally, there is no disclosure or suggestion in EP'963 to combine the presently claimed low temperature conversion catalyst with the presently claimed upstream conversion catalyst in any of the references. The catalyst of the present invention is located in the exhaust stream based on the recited temperature parameters. In particular, there is no disclosure to have a low temperature conversion catalyst located relative to the exhaust gas stream such that said low temperature conversion catalyst is never exposed to a temperature in excess of about 550°C in combination with an upstream conversion catalyst, said upstream conversion catalyst, when present, being located upstream of said low

temperature conversion catalyst relative to the direction of flow of exhaust gas stream to be exposed to temperatures in excess of 650°C. As reviewed above, this structure is not disclosed or suggested in the cited references taken separately, and there is nothing to in the combination to add the missing elements which are presently claimed.

Accordingly, reversal of the rejection of claim as obvious over EP'581, WO'119 or WO'244 in view of EP'963 as obvious is respectfully requested.

O.A. ¶ 18 Claim 7 has been rejected as obvious EP'581, WO'119 or WO'244 in view of Dunne as applied to claim 5 above and further in view of EP'963.

Initially, reference is made to the above discussion distinguishing the cited references. The same comments apply with regard to claim 7. Although, EP'963 discloses an upstream, this does not compensate for the lack of disclosure of the specifically claimed low temperature catalyst having a light-off temperature  $T_L$  of less than about 200°C, and being located relative to the exhaust gas stream such that said low temperature conversion catalyst is never exposed to a temperature in excess of about 550°C taken in combination with an upstream conversion catalyst, when present, being located upstream of said low temperature conversion catalyst relative to the direction of flow of exhaust gas stream to be exposed to temperatures in excess of 650°C. The upstream and downstream catalysts are both designed for high temperature operation. The adsorbent stores hydrocarbons at low temperature for release when the system heats up.

Accordingly, reversal of the rejection of claim as obvious over EP'581, WO'119 or WO'244 in view of dunne and further in view of EP'963 as obvious is respectfully requested.

O.A. ¶ 19 Claims 3-4, 9,15,(17-19)/(3-4) have been rejected as obvious over Abe in view of Urata and Giarrizzo.

Reference is made to the above discussion distinguishing the Abe as well as the comments relating to Urata and Giarrizzo. The same comments apply taking EP'581 with Urata and Giarrizzo.

Accordingly, reversal of the rejection of claim as obvious over EP'581 in view of Urata and Giarrizzo as obvious is respectfully requested.

O.A. ¶ 20 Claims 3-4, 15 have been rejected as obvious over EP'581 in view of Urata and Giarrizzo.

Reference is made to the above discussion distinguishing the EP'581 as well as the comments relating to Urata and Giarrizzo. The same comments apply taking EP'581 with Urata and Giarrizzo.

Accordingly, reversal of the rejection of claim as obvious over EP'581 in view of Urata and Giarrizzo as obvious is respectfully requested.

O.A. ¶ 21 Claim 5 has been rejected as obvious over EP'581 in view of Dunne.

Reference is made to the above discussion distinguishing EP'581 in view of Dunne. The same comments apply with regard to claim 5.

Accordingly, reversal of the rejection of claim as obvious over EP'581 in view of Dunne as obvious is respectfully requested.

O.A. ¶ 22 Claims (17-20)/1 have been rejected as obvious over EP'581 in view of WO'119 or WO'244 or EP'963.

Reference is made to the above discussion distinguishing EP'581 as well as WO'119 or WO'244 or EP'963. The same comments apply with regard to claims (17-20)/1.

Accordingly, reversal of the rejection of claim as obvious over EP'581 in view of WO'119 or WO'244 or EP'963 as obvious is respectfully requested.

O.A. ¶ 23 Claims (17-20)/(3-4) have been rejected as obvious over EP'581 in view of Urata and Giarrizzo as applied to claims 3-4 and further in view of WO'119 or WO'244 or EP'963.

Reference is made to the above discussion distinguishing EP'581 as well as (WO'119), (WO'244) and (EP'963) as well as Urata and Giarrizzo. The same comments apply with regard to claims (17-20)/(3-4).

Accordingly, reversal of the rejection of claim as obvious over EP'581 in view of Urata and Giarrizzo and further in view of WO'119 or WO'244 or EP'963 as obvious is respectfully requested.

O.A. ¶ 24 Claims (17-20)/5 have been rejected as obvious over EP'581 in view of Dunne and further in view of WO'119 or WO'244 or EP'963.

Reference is made to the above discussion with respect EP'581 as well as Dunne, WO'119, WO'244 and EP'963 as well as Urata and Giarrizzo. The same comments apply with regard to claims (17-20)/5.

Accordingly, reversal of the rejection of claim as obvious over EP'581 in view of Dunne and further in view of WO'119 or WO'244 or EP'963 as obvious is respectfully requested.

O.A. ¶ 25 Claims (20)/1 has been rejected as obvious over Abe, WO'119 or WO'244 or EP'963 in view of Abe as applied to claims 1-2 further in view of EP'581.

Reference is made to the above discussion with respect to Abe, WO'119, WO'244 and EP'963 as well as EP'581. The same comments apply with regard to claims (20)/1.

Accordingly, reversal of the rejection of claim as obvious over Abe, WO'119 or WO'244 or EP'963 in view of Abe as applied to claims 1-2 further in view of EP'581 as obvious is respectfully requested.

O.A. ¶ 26 Claims (20)/(3-4) have been rejected as obvious over Abe or WO'119 or WO'244 or EP'963 in view of Abe in view of Urata Giarrizzo and further in view of EP'581.

Reference is made to the above discussion with respect Abe, WO'119, WO'244 and EP'963 as well as Urata, Giarrizzo and EP'581. The same comments apply with regard to claims (20)/(3-4).

Accordingly, reversal of the rejection of claim as obvious over Abe, WO'119 or WO'244 or EP'963 in view of in view of Urata and Giarrizzo and further in view of EP'581 as obvious is respectfully requested.

O.A. ¶ 27 Claim (20)/5 has been rejected as obvious over Abe or WO'119 or WO'244 or EP'963 in view of Abe in view of Dunne and further in view of EP'581.

Reference is made to the above discussion with respect Abe, WO'119, WO'244 and EP'963 as well as Dunne and EP'581. The same comments apply with regard to claim (20)/5.

Accordingly, reversal of the rejection of claim as obvious over Abe, WO'119 or WO'244 or EP'963 in view of in view of Dunne and further in view of EP'581 as obvious is respectfully requested.

For the above reasons, presently presented claims 1-7, 9-11, 15 and 17-20 are not suggested or disclosed in the cited combination of references and reversal of the rejections under 35 USC § 103 is respectfully requested.

9. CONCLUSION

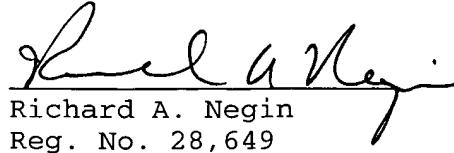
For the reasons given above, reversal of the rejection of the claims claims 1-7, 9-11, 15 and 17-20 of the above referenced application as obvious over the cited art is respectfully requested.

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10. APPENDIX OF CLAIMS INVOLVED IN THE APPEAL

(see attached)

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APPENDIX OF CLAIMS INVOLVED IN THE APPEAL

The claims on appeal read as follows:

1. A catalytic converter system located downstream of an engine, the catalytic converter system being suitable for catalyzing the conversion of hydrocarbons, carbon monoxide, nitrogen oxides and other pollutants contained in an exhaust gas stream, the converter system comprising:

a low temperature conversion catalyst comprising a platinum group metal component dispersed on a support material, said low temperature conversion catalyst having a light-off temperature  $T_L$  of less than about 200°C, and being located relative to the exhaust gas stream such that said low temperature conversion catalyst is never exposed to a temperature in excess of about 550°C;

a hydrocarbon adsorbent material located at a position selected from the group consisting of upstream of said low temperature conversion catalyst relative to the direction of flow of said exhaust gas stream and at said low temperature conversion catalyst relative to the direction of flow of said exhaust gas stream, and being capable of adsorbing hydrocarbons present in said exhaust gas stream and of desorbing the adsorbed hydrocarbons when the temperature of said low temperature conversion catalyst has exceeded said light-off temperature thereof; and

optionally, an upstream conversion catalyst, said upstream conversion catalyst, when present, being located upstream of said low temperature conversion catalyst relative to the direction of flow of exhaust gas stream to be exposed to temperatures in excess of 650°C.

2. The converter system of Claim 1, wherein both said low temperature conversion catalyst and said hydrocarbon adsorbent material are deposited on the same or separate refractory carriers.

3. The converter system of Claim 1, wherein said low temperature conversion catalyst is disposed at a position where the temperature of the engine exhaust gas stream is less than 550°C.

4. The converter system of Claim 3, further in combination with a muffler at a muffler position and a tailpipe downstream of the muffler in a tailpipe position, said low temperature conversion catalyst is disposed at the tailpipe position downstream of the muffler position.

5. The converter system of Claim 1, wherein said low temperature conversion catalyst comprises platinum supported on titania support material; wherein said low temperature conversion catalyst has been reduced to enhance its activity for converting hydrocarbons and carbon monoxide to innocuous compounds; wherein said adsorbent material comprises a hydrothermally stable molecular sieve material having a T(50) of at least about 750°C, a hydrocarbon selectivity greater than 1, and a Si/Al ratio of at least about 10; and wherein said low temperature conversion catalyst is located relative to the exhaust gas stream such that said low temperature conversion catalyst is never exposed to a temperature in excess of about 500°C.

6. The converter system of Claim 1, which comprises said optional upstream conversion catalyst.

7. The converter system of Claim 5, which comprises said optional upstream conversion catalyst.

9. The converter system of Claim 3, wherein said low temperature conversion catalyst and said adsorbent material are disposed in separate layers on a refractory carrier and are located relative to the exhaust gas stream such that said low temperature conversion catalyst is never exposed to a temperature in excess of about 300°C.

10. The converter system of Claim 2, wherein said refractory carrier is in the form of a honeycomb configuration having cell



comprising cell walls; and wherein said low temperature conversion catalyst and said adsorbent material are present in separate layers deposited on the cell walls of said honeycomb configuration.

11. The converter system of Claim 2, wherein said refractory carrier is in the form of a honeycomb configuration having cell comprising cell walls; and wherein said low temperature conversion catalyst and said adsorbent material are both present in the same layer deposited on the cell walls of said honeycomb configuration.

15. The converter system of Claim 3, wherein said low temperature conversion catalyst and said adsorbent material are both present in the same layer deposited on a refractory carrier; and wherein said refractory carrier is located relative to the exhaust gas stream such that said low temperature conversion catalyst never is exposed to a temperature in excess of about 300°C.

17. The converter system of any one of Claims 1, 3, 4 and 5, wherein there is from about 10 to about 1000 g/ft<sup>3</sup> of said platinum group metal in said low temperature conversion catalyst.

18. The converter system of Claim 17, wherein said low temperature conversion catalyst and said hydrocarbon adsorbent material are supported on the same refractory carrier, said refractory carrier being in the form of a honeycomb configuration.

19. The converter system of Claim 18, wherein said low temperature conversion catalyst and said adsorbent material are deposited in separate layers on said refractory carrier.

20. The converter system of Claim 17, wherein said low temperature conversion catalyst has a light-off temperature of from about 70°C to about 100°C.